Propositional modifiers in early English medical prose: A study on their historical development in noun phrases

Biber, Douglas ; Grey, Bethany ; Honkapohja, Alpo ; Pahta, Päivi

14 Prepositional modifiers in early English medical prose

A study *on* their historical development *in* noun phrases

DOUGLAS BIBER, BETHANY GRAY, ALPO HONKAPOHJA AND PÄIVI PAHTA

1. Introduction

The fourteenth and fifteenth centuries represent the first phase in the gradual vernacularisation of science that began in England and elsewhere in Europe in the later Middle Ages (see e.g. Crossgrove *et al.* 1998). Most scientific medical treatises in manuscripts from this period are translations or adaptations of texts originally composed in Latin or Greek in ancient or medieval scholastic centres of learning; some English versions are based on intervening French translations. The treatises represent relatively few, but complicated, textual traditions, reflecting a multilayered and multilingual transmission of medicine across cultural and linguistic borders, involving successive stages of copying, translating, paraphrasing, excerpting and conflating, by scribes and translators over several centuries (see Pahta and Taavitsainen 2004). As a result, most texts within one subject area in fact recycle the same information, ultimately going back to a few prestigious Latin and Greek medical works, often using the exact same words.

Detailed consideration of these medieval manuscript-based treatises highlights the challenges that the first English translators of medical texts faced in their attempt to vernacularise medical science. English had yet to develop the lexical resources and syntactic conventions to address learned topics rich in technical and theoretical details for which the Greco-Roman learned tradition had developed its own means of expression over a millennium. Latin was the logical place to look for a model, and many texts in this category are characterised by heavy reliance on the source language. The difficulties of expressing abstract concepts and complicated causal and spatial relations in English have been pointed out in earlier studies (Taavitsainen *et al.* 2005, 2006). However, it is also likely that this rapidly changing communicative setting proved to be important in the evolution of new grammatical constructions.

Corpus studies over the past two decades have explored the distinctive grammar of written (versus spoken) registers (see e.g. Biber 1988; Biber *et al.* 1999). One important finding documented by these studies is that the discourse of academic prose is characterised by an extremely heavy reliance on nouns and non-clausal noun phrase modification, in contrast to the clausal embedding common in spoken registers (and popular written registers like fiction).

For example, the following sentence is typical of modern-day academic prose:

(1) Specifically, we were interested in the qualitative ecological difference in emphasis between changes in composition vs. changes in relative abundance.

In this example, the authors attempt to adopt a friendly style of presentation, using the first-person pronoun *we* rather than a passive voice construction. However, the structure of this sentence is almost entirely phrasal rather than clausal. That is, there is only one verb in the sentence (*were*) but numerous nouns (*difference*, *emphasis*, *changes*, *composition*, *changes*, *abundance*), attributive adjectives (*qualitative*, *ecological*, *relative*) and prepositional phrases functioning as noun modifiers (*difference in emphasis between changes in composition vs. changes in relative abundance*).

This grammatical discourse style is unlike the discourse of most other present-day registers – both spoken and popular writing – which rely on clausal structures rather than non-clausal modification. For example, the following turn from a conversation illustrates the dense use of verbs and dependent clauses that is typical in spoken language.

(2) Well they, they had a party. I forget what it was. They had it at a friend's house. I can't remember why it wasn't at their house anyway. And they had bought a bottle of Bailey's because they knew I liked Bailey's.

Written fiction similarly relies mostly on clausal discourse, such as:

(3) Rambo stared at the square of wood until it seemed to enlarge and drift toward him, filling his vision. He no longer heard the wind chimes, no longer smelled the incense, no longer felt the blow.

Historical studies have documented many grammatical changes within academic writing over the last several centuries. For example, Biber and Finegan (1997) use MultiDimensional Analysis to show how academic writing has steadily evolved over the past three centuries towards an increasing use of noun phrase structures.

One of the most important grammatical devices employed in this historical development is the prepositional phrase (PP), especially functioning as a post-nominal modifier. Biber and Clark (2002 analysed the patterns of use for post-nominal modifiers in medical research writing from the ARCHER

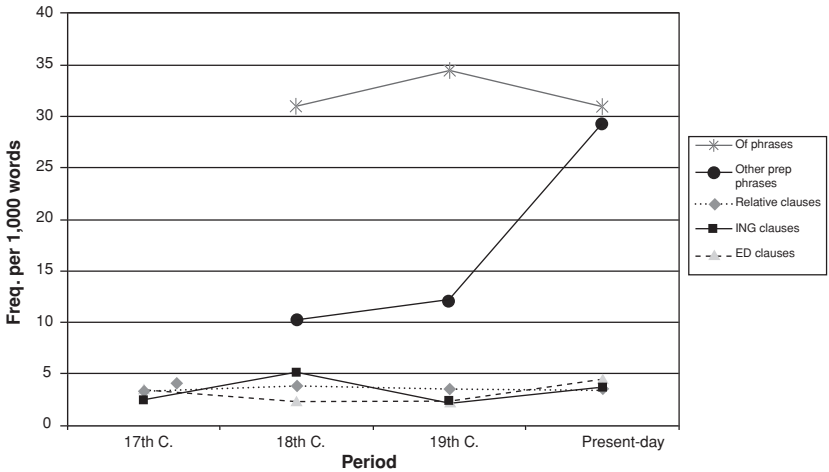

Figure 14.1 Noun post-modifier types in medical prose, across periods

corpus, extending over the period 1650–1990. Figure 14.1 (adapted from that study) shows that many types of noun post-modification have been stable in medical prose across the past four centuries. For example, *of*-phrases were frequent in academic writing across all periods. In contrast, the other prepositions (e.g. *in*, *on*, *between*, *for*, *with*) have increased dramatically as noun modifiers, and this change accounts for much of the distinctiveness of modern academic prose (see example (1) above).

One possible explanation for these historical developments is the unique communicative circumstances of writing, which permit extensive planning and revision, in contrast to the real-time communicative circumstances of speech (see Biber 2009; Biber and Conrad 2009). That is, writers can take as much time as they want to plan exactly what they want to write, and if they write something unintended, they can delete/add/revise/edit the language of the text. Thus, the final written text that an external reader sees might bear little resemblance to the initial words that the author produced, and readers usually have no overt indication of the extent to which the author has revised the original draft. Nearly all written registers offer the opportunity for extensive planning and revising during production, even if the author does not avail him/her-self of this opportunity. Other communicative factors, especially relevant in academic writing, are also influential here, such as the 'information explosion', the associated need for economy as there is more information to be communicated, and the increasing specialisation of the audience.

The historical changes documented to date represent a fundamental shift in the discourse style of academic writing. However, we know little about the origins of these developments. In particular, we know little about the early

history of prepositions other than *of*: when did these prepositions first come to be used as noun modifiers (versus adverbials and other clausal functions)? Further, is it possible to track the evolution in the kinds of meanings that these prepositions express?

The fourteenth and fifteenth centuries are likely to be important in this development, given the rise of vernacularised scientific medical writing during that period. The present study describes the early history of the prepositions *in* and *on* as noun modifiers. The study is based on analysis of medical manuscripts from the period 1375–1500, and the use of these prepositions is compared to that in medical treatises from the early years of printing (1500–1700).

2. Corpus and methods

The texts analysed for the study come from the corpora *Middle English Medical Texts* (MEMT, 1375–1500) and *Early Modern English Medical Texts* (EMEMT, 1500–1700) – the first two components of the *Corpus of Early English Medical Writing*, a three-part domain-specific corpus containing a wide range of medical texts from the period 1375–1800 (see Taavitsainen and Pahta 1997; Taavitsainen *et al.* 2006; Taavitsainen and Pahta in press). For this study we have analysed the category of 'specialized treatises' in MEMT and its equivalent, 'treatises on specific topics', in EMEMT.

The MEMT data (99,059 words, twenty-five texts) consist of medical treatises that circulated in manuscripts written in the period 1375–1500, with the exception of one text, i.e. William Caxton's *Ars moriendi*, a popular handbook providing spiritual and practical guidance for people who are dying, one of the earliest printed English texts containing medical information, printed in 1491. As noted above, these treatises represent the early emergence of scientific medical writing in English rather than Latin. They include learned theoretical treatises on physiology and natural philosophy, as well as tracts focusing on a specific illness or field of specialisation, or a particular method of prognosis or treatment. A wide range of specific topics are treated, such as ophthalmology, reproduction, gynaecology and obstetrics, urinoscopy, phlebotomy, epilepsy, syphilis and the plague.

The 'treatises on specific topics' in EMEMT (514,132 words, sixty texts) are samples of printed texts, representing the bulk of early English printed books on medicine from the period 1500–1700. In the early part of the period, original publications in medical science were mostly written in Latin and translated into vernacular languages, and thus many of the early texts in this dataset are also based on Latin originals. Translations from other languages became more common in this period as well, which is also reflected in the data. It is also worth noting that some of the early printed texts had earlier circulated in manuscript form. However, during the 200-year period, the functional range of languages changed, and towards the end of the period

it is increasingly common to find theoretical cutting-edge science published originally in English; the most notable witness to this development is the *Philosophical Transactions of the Royal Society of London*, which began to appear in 1665 (see e.g. Atkinson 1999; see also Gray *et al.* in press).

The EMEMT samples also cover a wide range of topics in a wide variety of styles, the common denominator being a focus on an individual disease, method or therapeutic substance. The category has been divided into five subcategories based on the focus of the text:

(a) texts on specific diseases (e.g. struma, ague, fevers, pox)
(b) texts on specific methods of diagnosis or treatment (e.g. urinoscopy, astrology, phlebotomy)
(c) texts on specific therapeutic substances (e.g. nitre, gold, mithridatum)
(d) texts on midwifery and children's diseases
(e) texts on plague

The target audiences range from academic specialists to the widest popular readership, e.g. included in category (d) along with treatises for top experts in obstetrics is the most popular sex guide for centuries, *Aristotle's Masterpiece* (Taavitsainen and Pahta in press; Taavitsainen *et al.* in press).

For the quantitative analyses, we divided the MEMT and EMEMT texts into four major historical periods: 1375–1449, 1450–1499, 1500–1599 and 1600–1700. All occurrences of *on* were coded in the analysis. However, because the preposition *in* occurred more frequently, we coded a 10 per cent sample of tokens for the 1500–1599 and 1600–1700 periods, considering every tenth token from all texts.

In order to make further register and time-period comparisons, we also analysed the use of these prepositions in seventeenth-century dialogues, present-day conversation and present-day academic research writing. The seventeenth-century dialogues are taken from *A Corpus of English Dialogues* (CED), considering the court transcripts and depositions in that corpus (458,600 words, 60 texts). Present-day conversations were taken from the *Longman Spoken and Written English Corpus* (see Biber *et al.* 1999: 29); the data analysed here consist of a 25 per cent sample of the prepositions from fifty randomly selected texts (340,199 words). We constructed our own corpus of twentieth-century academic research articles, sampling from science (biology, medicine, ecology, physiology), education, psychology and history in the years 1965, 1985 and 2005. For the purposes of the present study, we again analysed a 25 per cent sample of the prepositions for a subset of forty-two academic research articles (316,420 words) from 1965 and 2005.

The first step in the analysis was to code each token of the prepositions *in/on* for their syntactic function. The primary distinction here was between noun modifiers and other functions, although, when possible, we also attempted to identify the specific function of clausal uses (e.g. as an adverbial or adjective complement). For example:

(4) ***in***
noun modifier: Circulus with grauell betokoneth ache in the backe nyghe vnto the fundyment
adverbial: And this colour apere in Haruest or in winter
adjective complement: This vryne yf it be thycke in sustau[n]ce

(5) ***on***
noun modifier: This colour betokeneth a Feuer throughe chafynge of the lyuer/ a Feuer quartayne/ & a postume on the longes
adverbial: Also make a playster of Dywte & of wyne yf it be y^{e} Flowres and lay it on the nauell
adjective complement: The nose somwhat heary on the end . . . declareth that manne to be of a good condicion in all thynges

The subsequent detailed analyses of meaning focused on uses that were clearly noun modifiers. Some occurrences were indeterminate because they could be interpreted as either noun modifiers or adverbials, as in:

(6) And yf thou se two small graynes in the seconde regyon or mo or lesse knytte to a small sky / than it betokeneth peyne in the brest of rewme

These uses are counted in the 'other' functions and not included in the detailed analyses of noun modifiers.

For the quantitative analysis of meanings, we coded a two-way distinction: concrete/locative meanings versus abstract meanings. Our rubric for this distinction was simple: if the head noun referred to a tangible, physical entity and the prepositional phrase identified a concrete location or a tangible object, the occurrence was coded as a concrete/locative meaning. All other uses were coded as 'abstract'. The hypothesis for this part of the analysis was that the initial meanings associated with *in*/*on* as noun modifiers were concrete/locative, reflecting the stereotypical uses of these prepositions to identify the physical location of an object. The extension to other uses was hypothesised to be a later historical development, associated with the more abstract concepts and relationships described in later medical prose.

3. Frequency of use

Figure 14.2 plots the frequency of use for prepositional phrases with *in*, distinguishing between noun modifiers and other functions. This figure shows that the use of *in* PPs was quite stable in medical writing across the centuries covered by MEMT and EMEMT: *in* as a noun modifier was already well established by 1375, but rare in comparison to other functions, and essentially this same pattern of use continues across all four centuries.

For the sake of comparison, we also report the patterns of use in seventeenth-century dialogues, present-day conversation and present-day

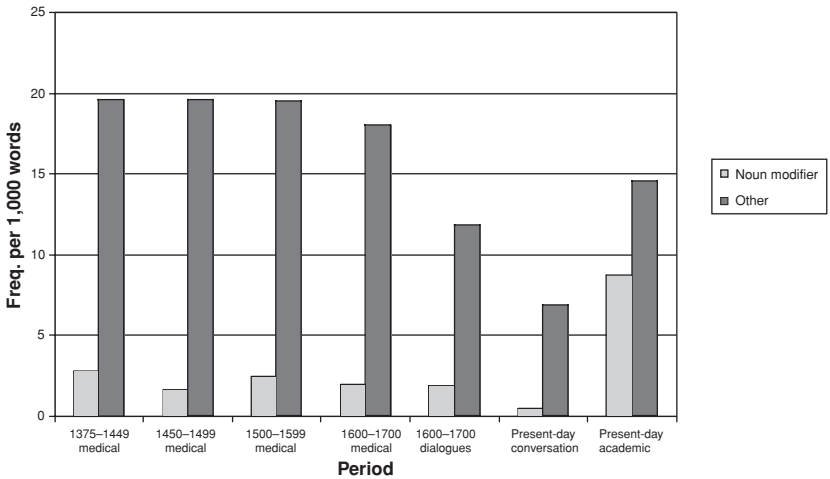

Figure 14.2 *In* as noun modifier versus other functions, across periods

academic research writing. In the seventeenth century, there was little register variation in the use of *in* PPs: figure 14.2 shows that the overall frequency of *in* was somewhat lower in seventeenth-century dialogues, but the low proportional use of noun modifiers is essentially the same as in medical writing. There are even fewer occurrences of *in* PPs as noun modifiers in modern conversation, although the overall frequency of *in* is also lower. In contrast, the only dramatic pattern of change shown in figure 14.2 is for present-day academic prose, where *in* PPs as noun modifiers account for almost 40 per cent of all occurrences of *in*. Thus, the patterns of grammatical use for *in* PPs remained relatively constant across registers for several centuries, followed by recent strong change focused on academic writing.

Figure 14.3 shows that the overall trends are similar for *on* PPs. Although the overall frequencies of use are considerably lower than for *in* PPs, the patterns are stable across the entire period 1375–1700: *on* PPs as noun modifiers are attested already in the period 1375–1450, but they are quite rare in comparison to other functions in all of these periods. Seventeenth-century dialogues show essentially the same pattern, indicating that there was little register variation in the use of *on* PPs during these periods. In this case, modern conversation shows a much higher overall use of *on* (in large part due to the increase in phrasal verbs), but the use of *on* PPs as noun modifiers remains rare. However, here again the dramatic historical change has occurred in academic writing over the past two centuries, so that 40 per cent of all *on* PPs in present-day academic writing are functioning as noun modifiers.

Thus, considering only the quantitative frequency of use, we would conclude that little change occurred during the period 1375–1700: both *in* and

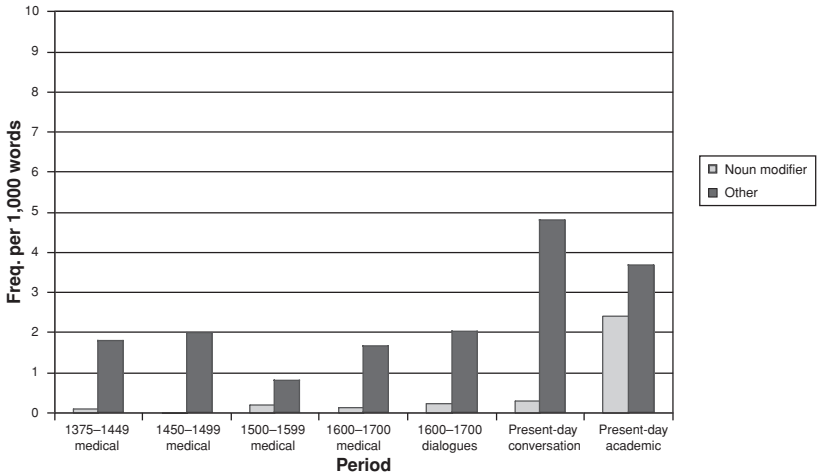

Figure 14.3 *On* as noun modifier versus other functions, across periods

on were used as noun modifiers in all historical periods, apparently in both academic writing and in speech (at least since 1600), but that use was quite rare in comparison to other grammatical functions. However, when we turn to a detailed consideration of the meanings expressed by *in* PPs and *on* PPs, we can begin to observe the early stages of the dramatic historical changes that occurred in later centuries.

4. Extension of meanings

While the overall frequency of use for *in* and *on* as nominal modifiers has been relatively stable across the period 1375–1700, the meanings expressed by these structures have undergone change and extension from concrete/locative meanings to more abstract meanings. In the fourteenth and fifteenth centuries, the large majority of noun-modifying *in* PPs expressed concrete/locative meanings, while abstract meanings became more prevalent in the sixteenth and seventeenth centuries (see figure 14.4). The development of noun-modifying *on* PPs lags behind *in* PPs, so that the first abstract uses begin to emerge in the sixteenth century and become somewhat better established by the seventeenth century (see figure 14.5).

Thus, both *in* and *on* are used mostly for concrete/locative meanings in the fourteenth and fifteenth centuries. For example,

(7) Glaucus a posteme in the right side, a bledder on the lunge Circulus

On PPs are used consistently to express the meaning of physical location, usually on the surface of some object. This is the primary meaning of *on* PPs up through the seventeenth century; for example:

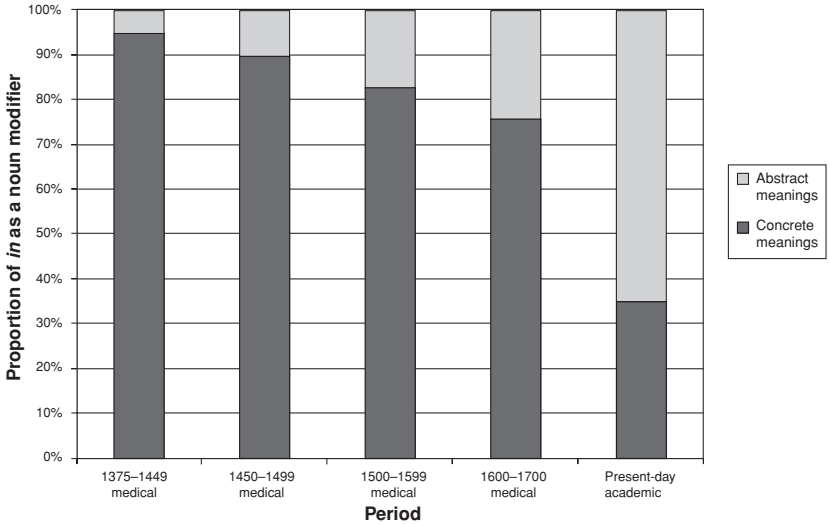

Figure 14.4 *In* as noun modifier: concrete versus abstract meanings

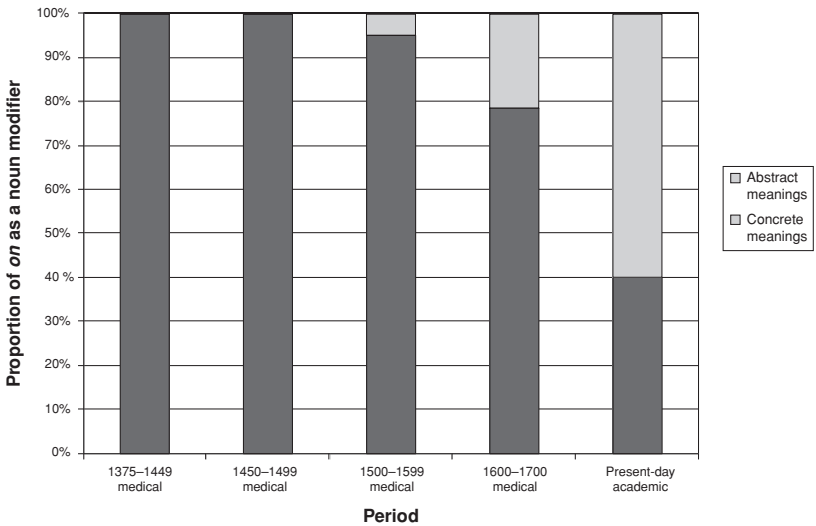

Figure 14.5 *On* as noun modifier: concrete versus abstract meanings

(8) a postume on the longes
blisters and hackes on the lips
two on each side

In contrast, *in* PPs express a range of specific meanings that can be considered concrete/locative. These include:

(9) *location inside a body part*
a wynde in the heed
ache in the backye
pain in his knee

(10) *location inside an object or substance*
the oil in the thermometer
kernels in your meat
quantity of opium in it [*i.e. Theriacle*]

(11) *geographic location*
our apothecaries in England
John Bissite in St. Peters Parish

(12) *textual location*
the foregoing chapters in the first part
his judgement and candor in his writings

In addition, *in* PPs were used to express concrete meanings other than physical location. These were coded as 'concrete', but they express intermediate meanings that can be considered as extensions to the core locative meanings. Two major uses are attested here: time expressions and generic reference. The time references can be seen as an extension of physical location to the temporal domain, as in:

(13) each day in the weeke
seaven of the clocke in the morning
his own experience in the same time
experience in his time

On PPs were also occasionally used with this meaning:

(14) the first houre of the sunne-rising on every day

With the generic uses, both the head noun and the 'location' noun have concrete/tangible meanings, but the whole construction refers to a general entity rather than a specific object or person, as in:

(15) mercury in medicines

Interestingly, this use was especially prevalent in the fifteenth century; for example:

(16) And þare is anoþer maner of blak in uryn þat is causyd of adustyoun complet

Citryn color in uryn sais þat colre & fleume regnys in þe body, bod mare colre þan fleume.

þai are þe vaynys in þe wrestys & are callyd þe vayn powcys or þe pows vaynes

Alsa rubeus or subrubeus with a body thyk & drubly says roringe &

disturblynge of humours in þe body.

The prevalence of this use in the fourteenth- and fifteenth-century manuscripts reflects the communicative purposes of those texts: to document general medical conditions and the recommended treatments for those conditions. In contrast, the more recent texts include descriptions of specific case studies, and as a result we find a mix of both specific and generic uses of *in* PPs. Most occurrences with this meaning in the sixteenth and seventeenth centuries use generic reference to identify a condition that is characteristic of humans generally, as in:

(17) helthe in a sanguyne man
rot . . . in dead men
privy parts in women
the cause of rheume in children
a companion in the whole generation

There are few genuinely abstract uses of these prepositional constructions in these texts and, for the most part, those uses begin to emerge in the sixteenth century. One of the uses for *on* PPs is to refer to a logical rather than a physical position, as in:

(18) probabilitie on both sides
one principall reason on their side

On is also used in the idiomatic expression *travel on foot* to refer to the physical entity used to accomplish movement; according to the *Oxford English Dictionary*, this use can be traced back to Old English.

The most common abstract meaning for *on* PPs in the sixteenth and seventeenth centuries is to identify the topical domain that is associated with the head noun:

(19) a poem on the virtue of a laurel leaf
some remarks on the late debate about X
occasional notes on dr. George Thompsons
a learned author on this subject

Using the OED as a searchable corpus (available at corpus.byu.edu) indicates that this use emerged in the early fifteenth century, as shown in the following example from a legal will:

(20) iiij quayres of Doctours on Mathewe (1422)[1]
'Four quires of commentaries on the Gospel of Matthew'

In PPs commonly occur with a similar meaning, identifying the general research domain (rather than a specific topic). For example:

1 We are grateful to Dr Matti Kilpiö for his help with this translation.

(21) my studie in ciuile and humane learnynge
that Axiome in philosophie
his learning in all sciences
our work in the Astrological or chymical way of physic
the masterly heroes in medicine
new discoveries in medicine
writers in medicine
my sentiments in these matters

Figures 14.4 and 14.5 show that the uses in academic writing of both *in* PPs and *on* PPs as noun modifiers have changed dramatically from the seventeenth century to the present day: in present-day academic prose, the majority of these constructions are used to express abstract meanings rather than concrete/locative meanings. Those abstract uses include the identification of topical domain, as in seventeenth-century medical prose. However, there are also other abstract uses that were only beginning to emerge in the seventeenth century.

For *on* PPs, three abstract uses are especially important in modern academic writing:

(i) *a nominalisation* + on *PP, corresponding to a prepositional verb construction; for example*:
a biological dependence on physical conditions
(*compare*: it depends on physical conditions)

his reliance on the evolutionary thesis
(*compare*: he relied on the evolutionary thesis)

a focus on measures of student outcomes
(*compare*: someone focused on measures of student outcomes)

(ii) *a process noun* + on *PP, corresponding to a transitive verb with a direct object that is the 'patient' of the verb; for example*:
a significant influence on the tragic developments that followed
(*compare*: something influenced the tragic developments)

two factors have the greatest impact on college grades
(*compare*: two factors impact college grades)

a greater emphasis on intellectual behaviours
(*compare*: someone emphasises intellectual behaviours)

(iii) *constructions with an* -ing *non-finite clause following the preposition* on; *for example*:
an effect on determining choice
emphasis on providing support
any restriction on publishing it
research on promoting science learning

While the meaning of 'topical domain' still occurs in present-day academic prose, these other three uses are actually much more common. However, only one of these three is attested in our corpus of early medical texts: a conversion of the prepositional verb *operate on* to the corresponding nominalised equivalent:

(22) neither heat nor cold can obstruct its influential operation on the Body (1699)

This example comes from the very end of the historical period considered in our study (1699), while the other two 'abstract' uses that are common in modern academic writing are unattested in our Early Modern English medical corpus. Thus, it appears that the prevalent 'abstract' uses of *on* PPs in modern academic writing mostly began to emerge after the historical period in focus here.

In contrast, the prevalent abstract meanings of present-day *in* PPs are beginning to emerge in the seventeenth-century medical texts in our corpus. Two abstract uses are especially common in modern academic writing:

(i) *a process noun* + in *PP, corresponding to an intransitive verb with a subject that is the 'patient' of the verb; for example*:
the chief reason for Britain's decline in exports
(*compare*: Britain's exports declined)

a rapid increase in the size of the egg
(*compare*: the size of the egg increased)

variation in frequency
(*compare*: the frequency varied)

(ii) *constructions with an* -ing *non-finite clause following the preposition* in; *for example*:
invaluable assistance in recording electrocardiographs from canaries

difficulty in separating the sarcoplasmic proteins from the myofibrils

errors in rounding the total score

Both of these innovations are attested in the seventeenth-century texts from our corpus. The earliest and best established noun to occur with the first meaning is *difference*:

(23) whereupon riseth this difference in norishment (1576–1600)
there are found manifest differences in the male and female (1601–1625)
And there is no more difference in the nature of essence (1626–1650)
and besides her difference in Longitude and Latitude (1651–1675)

Beyond that, only one other process noun, *change*, occurs with an *in* PP in EMEMT:

(24) Poyson is either taken unawares, or given by subtility and stealth by wicked men. And this is a common sign, it presently makes a great change in the body, by which it differs from those that are bred from humors in the body by putrefaction. (1651–1675)

The second innovation (N + *in* + V-*ing*) first occurs in 1575–1600, but it appears to have become relatively well established during the seventeenth century; for example:

(25) the vertues and worth of this Medicine in helping and curing many diseases

pains in making water

the difficulty in searching out the causes of them

the truth of the marchaunt in transporting the same

5. Conclusion

In sum, if we focus only on frequency of use, our corpus investigation shows little historical change for the period 1375–1700: both *in* and *on* were used as noun modifiers in all historical periods, apparently in both academic writing and in speech (at least since 1600), but that use was quite rare in comparison to other grammatical functions. In contrast, dramatic changes in frequency of use occurred in academic writing after the period in focus here, i.e. in the last two centuries.

When we turn to a detailed consideration of the meanings expressed by *in* PPs and *on* PPs as noun modifiers, we can begin to observe the early stages of these dramatic historical changes of later centuries. That is, there were marked extensions in the range of meanings expressed by *in* PPs (and to a lesser extent *on* PPs), especially in the period 1600–1700. In particular, *in* PPs, and to a lesser extent *on* PPs, came to be used to express abstract meaning relationships, as opposed to the concrete/locative meanings expressed in earlier periods.

The earliest abstract use, for both *in* and *on*, is to identify a topical domain. Other abstract uses for *in* begin to emerge in the seventeenth century (e.g. to identify the semantic patient of a process). *On* PPs lag behind *in* PPs in the development of abstract uses: some of the abstract uses for *on* PPs have not yet emerged in the seventeenth century, even though those uses come to be prevalent by the twentieth century.

Considering the influence of Latin can help explain why *in* PPs change more rapidly than *on* PPs in taking on abstract uses: *in* is a common preposition with a noun head in Latin, while there is no direct equivalent for *on*.

The Latin phrases incorporated into Middle English medical texts seem to be nearly direct equivalents to the *in* PPs described above, mostly expressing concrete/locative meanings.[2] For example:

(26) location inside a body part: *in stomacho* ('in the stomach/gullet')
in a sickness: *in tussi & asmate* ('in a cough and asthma')
in a substance: *in vino* ('in wine')
in a work cited: *in historijs antiquo[rum]* ('in histories of the Ancients')
time of the year: *in autu[m]pno & i[n] uento boriali* ('in Autumn and in a Northern wind')

However, generic uses of *in* PPs also have parallel usages in Latin, as in:

(27) *roringe & disturblynge of humours in þe body (venae in carpis*)
compare: *Hec aqua renouat corpus humanu[m] & augmentat o[mn]ia naturalia i[n] cor[por]e humano* (This water refreshes human body and increases everything natural in the human body)

While the abstract meanings of *in* PPs, and to a lesser extent *on* PPs, become increasingly common in the early printed medical texts, in medieval medical treatises of the manuscript period abstract uses are rare. One explanation for these historical developments is the shifting communicative purposes found in medical treatises after the transition from manuscript to print. English medical treatises of the medieval period, circulating in manuscripts, typically communicated medical knowledge as generally accepted truths, derived from few authoritative sources, some of them originally written over a thousand years earlier. Despite their complex transmission histories, all texts within the same topic area said pretty much the same things. This began to change in the sixteenth and seventeenth centuries when gradual changes took place in the epistemology of science and medical knowledge became something that could be constructed here and now. Medical treatises of this period, disseminated in print, are characterised, for example, by more direct observation, attention to physical details and their physical or logical relationship, description of specific case studies and a wider range of information about particular treatments. Processes – in the natural world and in the research endeavour itself – started to become the object of description, resulting in medical communication characterised by greater use of nominalisations and, accompanying this, greater use of 'abstract' meanings for *in/on* PPs as noun modifiers.

2 Latin examples are taken from Alpo Honkapohja's on-going PhD research, a digital edition of the late medieval medical manuscript O.1.77. located at Trinity College Cambridge. The manuscript is dated to *c.* 1460. It is previously unedited.